

Concept Project ASAM OpenTestSpecification Webinar

Jann-Eve Stavesand
dSPACE GmbH

Dr.-Ing, Ludwig Friedmann
BMW AG

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Online



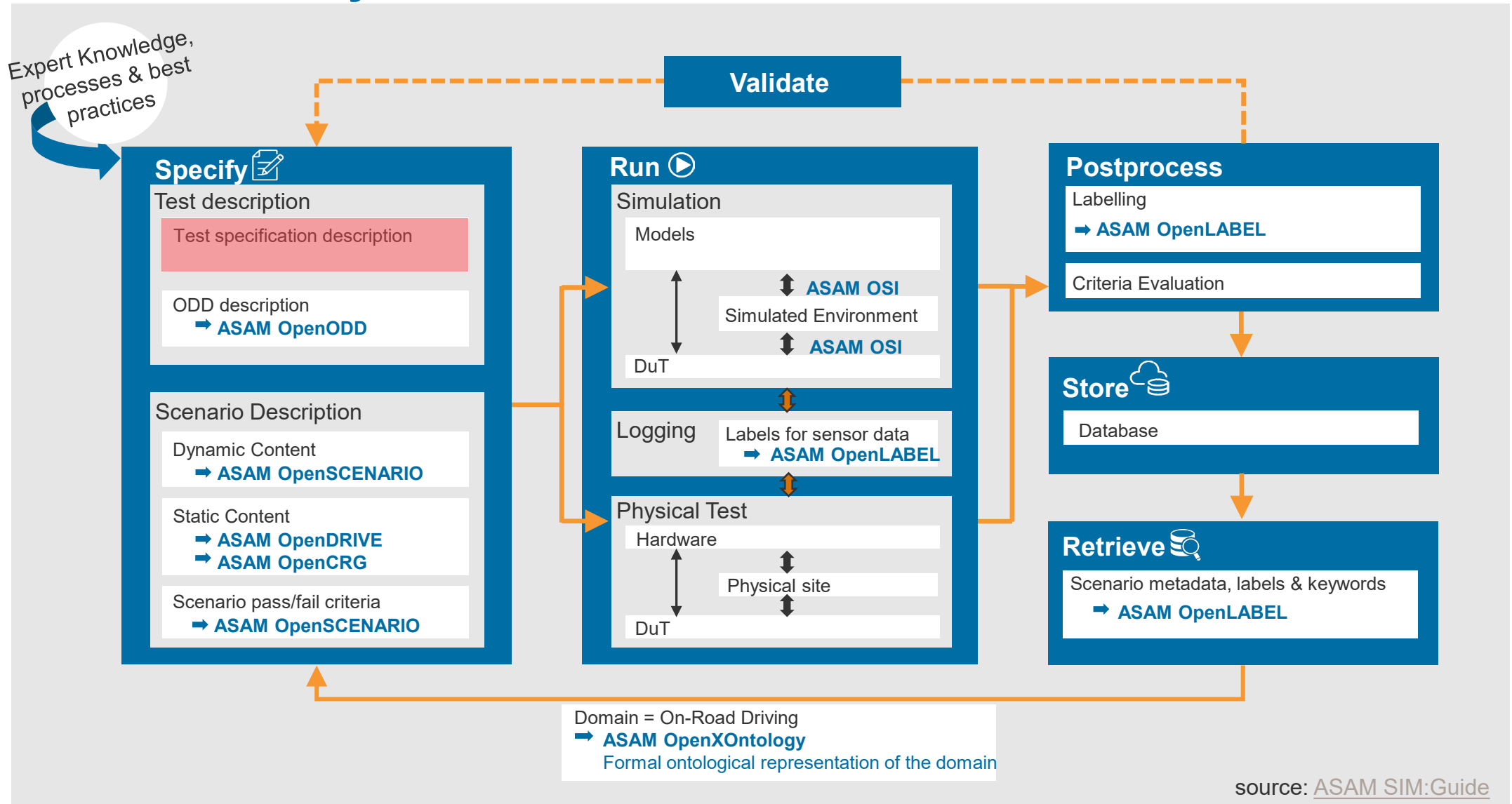
Association for Standardization of
Automation and Measuring Systems

Agenda

- ASAM Concept Project OpenTestSpecification
- Requirements on a standardized test specification
- Next steps: Call for candidates
- Discussion

ASAM Concept Project OpenTestSpecification

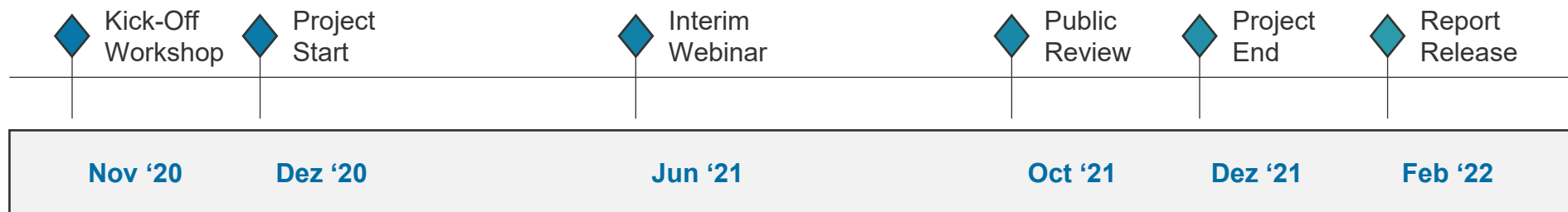
How did the activity start?



ASAM Test Specification Study Group

MISSION STATEMENT

- Examine relevant workflows and use cases for testing and homologation in the ADAS/AD domain
 - Identify relevant standards, potential workflows and their interplay
- Document a comprehensive overview of use cases, corresponding workflows, relevant users and standards
- Identify gaps in the workflows, leading to the identification of potentially needed additions to existing standards, liaisons between standards, or even the need for completely new standards
- Collect and document recommendations. Define a basis for follow-up activities and projects



ASAM Test Specification Study Group

REPORT

- Examination of **relevant test techniques and use cases for testing and homologation** in the ADAS/AD domain
- Documentation of **overall use cases for testing and homologation**, workflows implementing these, an overview of relevant users, standards and their application
- **Recommendations** for additions to existing standards or creation of new standards
- Core goal: **Define a valid basis for follow-up activities and projects**

Read the full report!

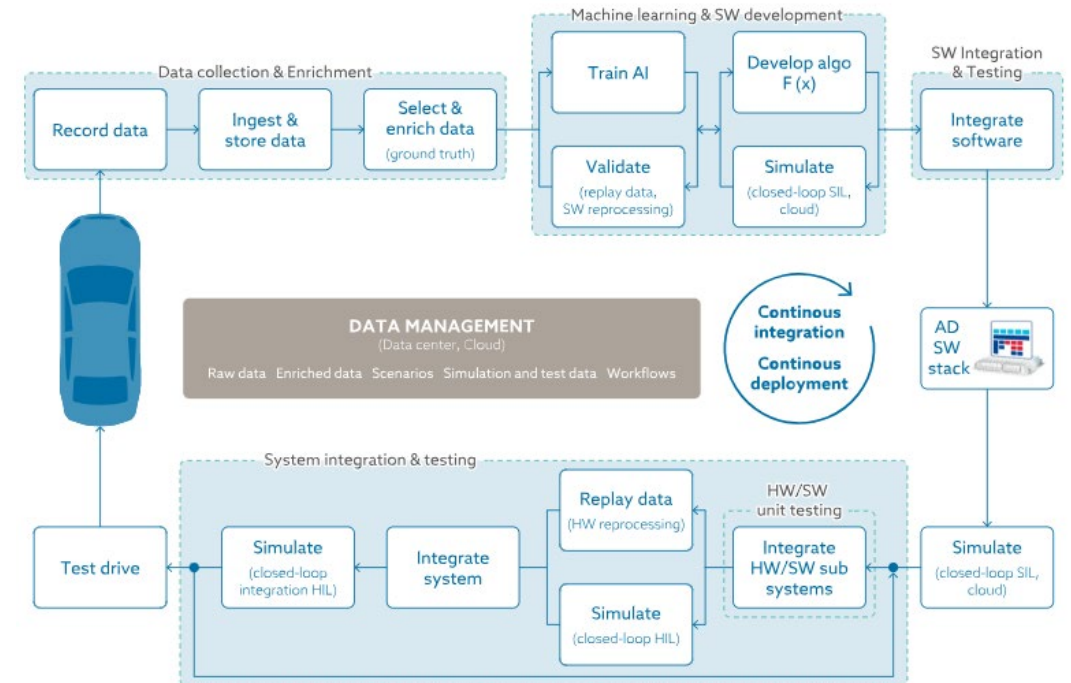
report.asam.net



Automotive Industry Insights

Data-driven Development and Shifting Responsibilities

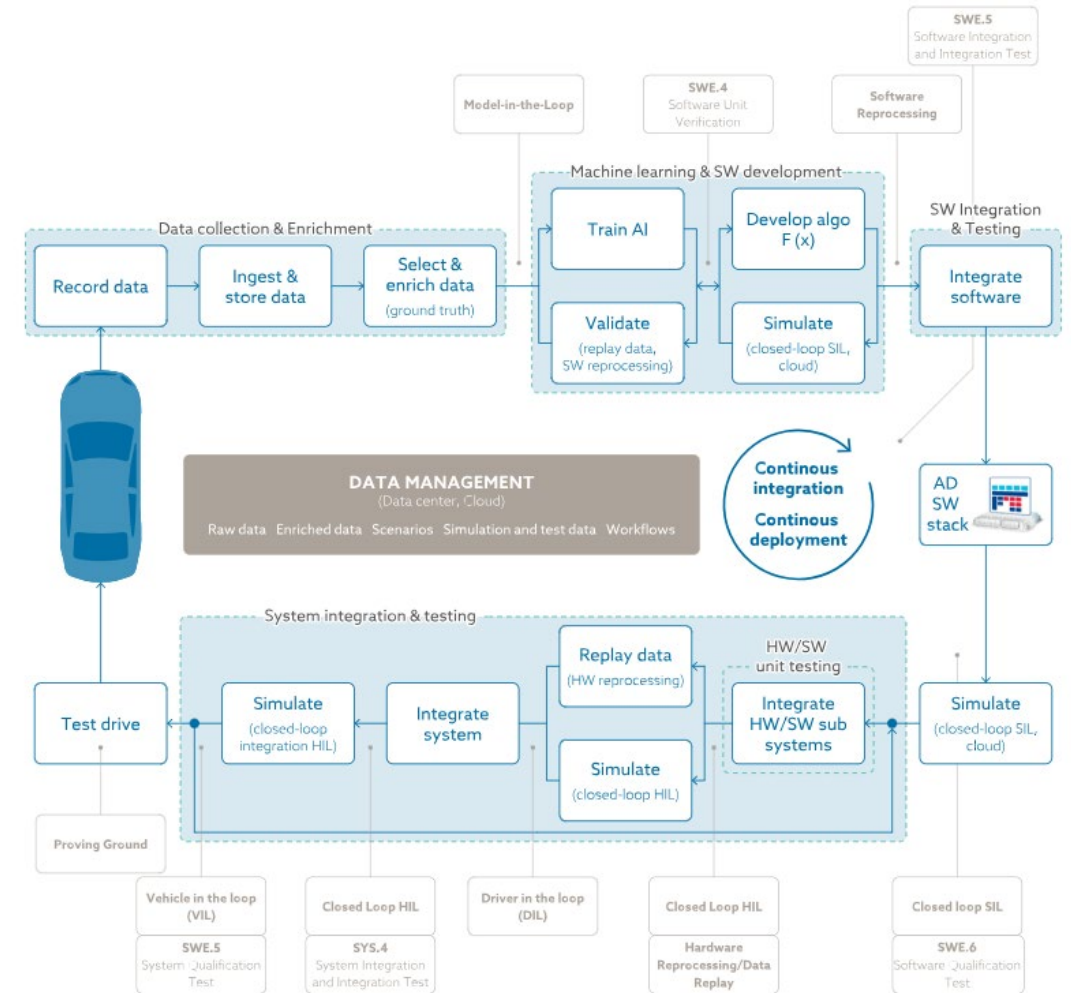
- Just as software is the key to most of today's automotive breakthroughs, data-driven development is key to establishing new automated driving functions.
- However, with Big Data, shifting paradigms, and AI, how will players in the automotive industry ensure the safety of functions and the future development of autonomous driving (AD)?
- A close examination of the situation shows the necessity of the early integration of best practices and comprehensive strategies into the process – a matter of intensive exchange, investment, and strong partnerships.



Automotive Industry Insights

The Derived Blueprint

- software-centric and (partially) autonomous vehicles if testing, verification, and validation are holistically managed, defined, and assessed.
- The blueprint shown should be seen as a starting point, enabling the automotive industry to challenge its own established procedures, to adapt them, if necessary, and to consciously use them to ensure safety.
- This blueprint is based on current safety standards, established best practices, and important norms.
- If you take Automotive SPICE, for example, and combine the phases of testing required there with data-driven development, it quickly becomes clear that the same requirements also come into play here. We do not have to reinvent the wheel, but the wheel must evolve.



ASAM Test Specification Study Group

TEST STRATEGY BLUEPRINT Test Methods and Use Cases

- Blueprint to meet the challenges of testing
- Holistic best practice that can be tailored to the specific requirements, but meets regulatory, legal, and technical requirements
- Possible basis for the homologation of automated driving functions and software-defined vehicles

	TEST ENVIRONMENT									
	MODEL- IN-THE-LOOP	SOFTWARE REPROCESSING	CLOSED-LOOP SIL	HARDWARE REPROCESSING DATA REPLAY	CLOSED-LOOP HIL	VEHICLE- IN-THE-LOOP (VIL)	DRIVER- IN-THE-LOOP (DIL)	PROVING GROUND	OPEN ROAD TESTING FIELD MONITORING	
TEST METHOD	REQUIREMENTS- BASED TEST (FUNCTIONAL TEST) <i>Software architectural design/Specified functionality</i>	More details 5.2.2 Requirements-based testing MIL	Test of ADAS/AD software via open loop e.g. detection quality	Testing of ADAS/AD software stack in closed loop For example the trajectory planning algorithms		Testing of complete effect chains of ADAS/AD function in closed loop e.g. integration testing of software and hardware	More details 5.2.7 Requirements-based testing vehicle in the loop		Testing in a controlled proving ground environment e.g. testing of the complete ADAS function in real-world conditions	Testing of the ADAS/AD functions under real-life use cases in the field e.g. shadowing
INTERFACE TEST <i>Software unit implementation/ Hardware-software interface specification</i>			Software integration tests e.g. test of interfaces for communication between ...	More details 5.2.6 Hardware reprocessing Data replay	Higher-level integration tests e.g. testing of bus communication between ECUs	Testing of complete ADAS/AD effect chain on system level e.g. interaction ...				
FAULT INJECTION <i>Testing of safety mechanism/ Robustness</i>	More details 5.2.3 Fault injection on MIL	Evaluation of robustness e.g. robustness against pixel faults	Verification of safety mechanisms e.g. out of range e.g. testing robustness of software calibration	Verification of safety mechanisms including hardware e.g. testing robustness	Testing of safety mechanisms with integrated system e.g. electrical failure simulation like short to ground e.g. testing of robustness against vehicle tolerances		Validation of overall system behavior e.g. testing of controllability	Verification of overall system performance e.g. testing of safety		
RESOURCE USAGE PERFORMANCE TEST <i>Sufficiency of resources/ Hardware architectural design</i>					Testing of the vehicle network performance e.g. sleep and wake					
SCENARIO-BASED TEST <i>Validation of real-life use cases/SOTIF validation</i>	Validation of control components e.g. testing of ADAS/AD effect chain in modeling environment		More details 5.2.8 Scenario-based testing SIL Closed loop		Validation of electronics integration e.g. testing the overall system behavior in challenging scenarios	Validation on system level e.g. complete system reaction to the most challenging scenarios	Validate interaction of driver with safety- relevant vehicle function (HMI, ADAS, active chassis systems), confirm controllability classifications from hazard analysis and risk assessment	Testing of system reaction in controlled environment e.g. testing of system reaction to the most relevant scenarios	Validating the complete system in real-life use cases e.g. endurance testing in the field	

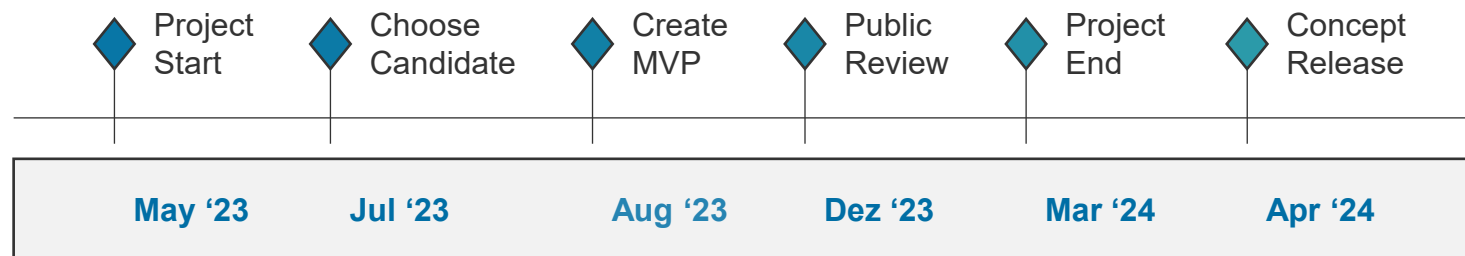
source: ASAM Test Specification Study Group Report

Concept Project ASAM OpenTEST

GOALS

Develop a technical basis, including clear requirements, for how a suite of standards could support various testing workflows

- Build on the test spec report to define requirements towards a suite of standards for testing. Use the blueprint as basis for defining the requirements
- Evaluate existing standards, standardization activities and/or proprietary solutions to determine if new standard(s) need to be defined
- Implement an MVP demonstrating consistent application of the concepts across different test platforms via a specific use case



source: ASAM

Concept Project ASAM OpenTEST

PROJECT STRUCTURE

Subgroup Standardization Proposal



Subgroup Blueprint Update

